Chapter 8
Breaking the Iron Law of Oligarchy: Computational Institutions, Organizational Fidelity, and Distributed Social Control

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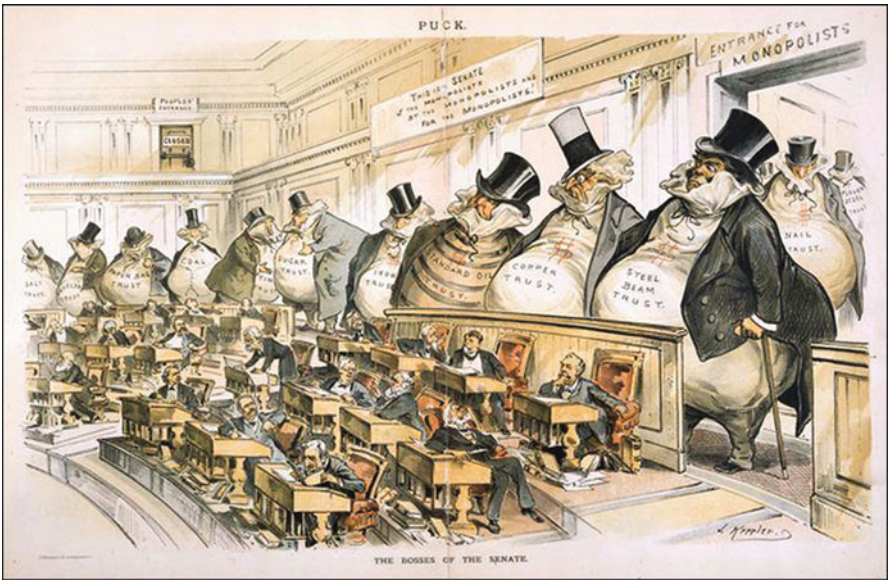
Corruption: Enabled from the Top Down



(Joseph Keppler 1889: http://www.senate.gov/artandhistory/art/artifact/Ga_Cartoon/Ga_cartoon_38_00392.htm)

An external observer, witness only to the last century of advances in technology, might easily suspect that contemporary society would be unpolluted, egalitarian, and

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prosperous. We now enjoy access to electric cars, low-cost solar energy, unprecedented communication technology, and dozens of other technological advances. This expectation is reinforced by the noble intentions of our political constitutions and the mission statements of our charitable organizations.

Despite these positive expectations, our world is still one of pollution, inequality, and poverty. Our leaders are charged to work toward collective goods, and yet leaders of organizations often work toward narrow self interests at the expense of the many and contrary to the declared organizational mission. Across all types of organizations, corruption emerges from the top down. Corruption can be understood by combining agency theory with Gottfredson and Hirschi's definition of crime (1990) where corruption includes acts of force and fraud by agents that employ organizational power and resources to further self-interests; these acts will often include undermining or damaging the organizational mission.[1] Accordingly, organizations across all areas of contemporary society suffer from corruption: economic firms, political parties, labor unions, educational institutions, governing bodies, judicial systems, and charitable organizations. Whenever agents exert organizational control, there is the risk that they will be tempted to subvert their authority and act toward their own interests. This problem is not new.

Over 100 years ago, Robert Michels (1911) observed that even the most radically democratic organizations would devolve into oligarchy. Michel saw oligarchy and corruption as the inevitable result of the hierarchical systems necessary for large-scale organizations. As authority and power accumulated at the tops of organizations, the temptations and rewards for corruption would become increasingly powerful, and the organization would make a transition to a system that primarily lines the pockets of the leadership elite and would progress very little toward the avowed goals of the organization. The decision making, influence, and capacity to evade effective monitoring accumulate at the tops of organizations. The systems of control flow primarily from the top down, and the absence of effective controls creates the conditions for corruption. The ideology or beliefs of the organization do not protect the members from the risk of corruption. Exemplary cases of organizationally facilitated crimes are easy to find among charities and churches as well as in government, education, sport, and business (Paltrow 2013; Washburn 2008; Mason et al. 2006; Huther and Shah 2000; Theobald 1990). The notion of a church leader like Pat Robertson using humanitarian aid to fund his private exploitation of a diamond mine seems more like satire than reality (Prophet Motive 1999). And yet, corruption and mismanagement of funds are commonplace in charities and other nonprofit organizations (Hundley and Taggart 2013).

As much as we might want to blame Pat Robertson, Jeff Skilling, or Dick Cheney for their behavior, we should remember that they behaved exactly as we should predict, given the opportunities presented by their organizational position. From the

[1] Corruption is sometimes used in a more limited sense where it is applied either to agents of the state, for instance, "using public office for personal gain" (Shah and Huther 2002) or actions of firms as they relate to the state, such as businesses agents bribing state officials to further the interests of their firm.

perspective of rational choice, and agency theory in particular, the difficulty in explaining corruption is not in understanding why people would steal or cheat, but in identifying the circumstances when they will not. Our organizations continue to be plagued by corruption precisely because they are designed with inherent shortcomings that make it very easy for leaders to serve their personal interests at the expense of the organizational mission. Those shortcomings hinge fundamentally on three factors: (1) hierarchically defined asymmetries in monitoring, sanctioning, and dependence such that high-status leaders in organizations enjoy very weak monitoring are subject to weak sanctions and are often the least dependent upon their organizations for their continued well-being; (2) extant systems of review, evaluation, and social control in organizations are concentrated by hierarchy and the application of these system is inescapably connected to actors identity and their organizational roles; and (3) opportunities for the most lucrative corruption are often correlated with position in the hierarchy such that upper-level managers who are the least constrained by the systems of control have the best resources to exploit. It is instructive to consider the control systems of extant organizations in light of theoretical models of social control, agency, and normative compliance.

The leaders of our organizations are made amoral by the design of those organizations, organizations that have not been redesigned to solve problems of oligarchy and corruption identified over a century ago. Rather than working to solve the most pressing human problem of the last century, we, the social scientists, information scientists, and social computing engineers, have been busy with other tasks. This chapter is an invitation to all who are in a position to study or design organizations to solve our most fundamental social problem.

Embedding Organizations in Systems of Computer-Mediated Interaction

Despite Michels' warning, organizations have continued to foster the concentration of power, organizational control, and inequalities of responsibility that gives rise to corruption and distortion of organizational missions. However, recent developments in large-scale online communities illustrate some of the ways that organizations can overcome the tendency toward oligarchy in organizations. Five examples from computational systems provide partial clues to how organizations can use digital affordances to overcome some of the inequalities and distortions that occur in traditional, large-scale hierarchical institutions.

> Large software-producing firms manage major code-writing projects through a code base that is edited in a context that preserves the content of every edit and the identity of every editor. In principle, these records could become the basis for organizational review and reward. However, such records of code are not typically part of a systematic, automated, and double-blinded peer review process. So, even though data on the quality of every programmers contributions is potentially available for evaluation and reward, that data is only partly used, and the reputations of the coders and the judges are likely to drive the assessment of any particular section of code.

Wikipedia, and wiki projects in general, demonstrates a radical flattening of organizational hierarchy. In principle, every participant can evaluate the contributions of every other editor and can administer positive and negative sanctions. The asynchronous nature of interaction and the automated recording system allow members to evaluate the content edits as well as the tenor of interactions preserved in the edit record. The project illustrates how large-scale organizations can be flattened and made more democratic. Positive reputational effects are present as are deleterious effects related to personalistic, political, and other capricious motivations. The same opportunities for double-blinded monitoring and sanctioning present in the large software datasets are available in Wikipedia as well. However, the review of contributions remains arbitrary, uneven, and overly influenced by reputation effects.

The online discussion system Reddit presents a large-scale online community where all registered contributors can vote contributions up or down, which in turn influences the visibility of those items and accumulates as an assessment of that member's identity. The system is large scale and has introduced many behind the scenes modifications to try to limit users' capacity to game the system. The system also allows users to create multiple accounts, which in principle allow contributors to contribute in ways that they might otherwise not feel free to. Identifiability of actions with identities is an affordance of computational institutions that can be managed to enhance contribution toward organizational missions.

Google documents allows multiple parties to edit a collaborative document and has the capability to present editors either as anonymized characters or as their login identity. While not currently enacted in this manner, contributions to such documents could be presented as edited by particular anonymized contributors who could be evaluated and sanctioned according to the content of their contributions alone, and those sanctions could be delivered to the identity of the contributor while maintaining the anonymity of both parties. The sanctioning acts themselves could be presented to evaluators who could judge the merit of those acts while maintaining double-blind anonymity.

CrowdGrader is a homework grading system that enlists students as peer reviewers in a double-blinded review system where mechanisms for encouraging accuracy of evaluations and feedback on the evaluation process are integral to the design. After submitting their homework contributors are required to evaluate the work of a random sample of anonymized others. The fundamental procedures of this grading system could be applied to contributions in coding projects, in Wikipedia, or in meetings that combine aspects of Google-documents-shared editing system and chat features.

Computer-mediated systems like these allow organizational actions to be captured as digital events, and they represent major advances in the potential democratization of participation in organizational monitoring and sanctioning. The open structure of reporting all contributions takes an important step toward transparency in democratic organizational control. These systems also operate, partly by leveraging the positive side of informal reputational systems. By linking contributions to semidurable identities, the contributors are encouraged to comply with organizational goals, and this compliance is made less subject to distortion by organizationally powerful individuals because it is a distributed system of monitoring and sanctioning. The association between acts and personally meaningful identities allows norms, identity, and social sanctions to influence behavior. Those positive dimensions are an important focus for the Kredible net conference and research efforts. However, this chapter will highlight the fact that reputation systems can also have counterproductive effects and that computational systems can be further extended with formal systems that double blind the review of organizational contributions and otherwise break the link between organizational actions and capricious implementation.

The digitally mediated contexts discussed above illustrate ways that online systems offer different interactive affordances for solving problems of social order, but extant systems still perpetuate many of the linkages between actor, action, sanction, and sanctioner that have the potential to foster oligarchy. The purpose of this chapter is to spur further attention to mechanisms that promote oligarchy in organizations and to begin the process of developing systems of distributed social control that will ultimately break the iron law of oligarchy.

Theoretical Models for Controlling Corruption in Organizations

Michels (1911) drew attention to several factors that would lead to organizational leaders to use their authority for personalistic ends. In different ways, the factors that undermine compliance with the organizational mission hinge on inequalities of access to and implementation of the systems of organizational control. The fundamental principles of these systems are best described by combining principles of Weberian institutional analysis with models of social control from the rational actor tradition. The following section articulates the key contributions of these and related theories for understanding social control in organizations.

Max Weber (1978) developed an analytic framework for assessing differences between institutional forms. Where Weber focused on developing ideal types of authority systems and classes of institutions this discussion will focus on how models in rational choice theory can help identify features of organizations that contribute to, or impede corruption in organizations. This analysis will focus on dimensions directly related to instrumentally rational action and generally to motives to action linked directly to material cost and benefit. Material incentives and instrumental rationality are not the only important dimensions of action, rather they provide an important minimum threshold for analysis. Future work should consider how charismatic, habitual, and traditional modes of action can both increase and decrease the likelihood of corruption in organizational types.

The rational actor framework (Coleman 1990) combines some version of the following assumptions in order to model the social implications of the decision making of actors in particular institutional contexts. (1) *Instrumental action.* Action is assumed to be instrumental or purposive which means that courses of actions are pursued because of the expected results of those actions. Actions are not therefore assumed to be expressive, habitual, bounded by tradition, or otherwise enacted without attention to the likely results of those actions. (2) *Self interested.* Actors are typically assumed to be individually self-interested, which means that they generally seek to maximize individual benefits while avoiding individual costs. (3) *Rational.* Rational actors use a comparison of costs and benefits to select the path of action that is most likely to maximize their interests. Rational refers to the decision-making process, not to the values held by individuals. (4) *Material values.* Actors typically are assumed to value money or other fungible goods (goods that can be exchanged for other goods). Depending on the context, power and status may serve as important supplementary value assumptions.

Given these first four assumptions models typically call two contextual factors into analysis as well: (5) *constraints of available information,* and (6) *discounting* of future payoffs for given levels of uncertainty. Although actors are assumed to act within the constraints of available information, differences in availability of information help to define important ways that organizations differ in their susceptibility to corruption. Similarly, in situations of organizational uncertainty, access to short-term gains will tend to undercut compliance with organizational rules that are incentivized by distant, uncertain future rewards.

The Problem of Controlling Agents

The best model for framing the problem of corruption in organizations is agency theory. Agency theory or the "problem of agency" refers to situations where one party, the principal, holds the rights to some resource, but needs to entrust another actor, the agent, to act on the behalf of the principal (Ross 1973; Arrow 1984; Eisenhardt 1989; Kiser 1999; Shapiro 2005). In businesses, employees are agents that are contracted to act on the behalf of the owners of the business, the principal. In Robert Michel's example of the Marxist labor union, the union leaders act as agents of the union, which is collectively owned by the membership. The leaders then are contracted to act on the behalf of the union as a whole, but like all agents, they are presented with options that will further their own interests at the expense of the principal.

Kiser uses a sociological variety of agency theory (Kiser 1999) to predict likelihood of corruption and inefficiency in state organizations and to explain variation in the organizational strategies adopted in a variety of premodern circumstances (Kiser and Schneider 1994; Kiser and Cai 2003; Kiser and Sacks 2011). Kiser and coauthors' use of agency theory focused on variations in capacity for monitoring, sanctioning, dependence, and the alignment of interests. Their research allows us, in the historical and comparative setting, to better predict when and where corruption should be more likely based on matching the organizational solutions to the agency problem as enhanced or limited by the technological and practical limitations of each case. In the contemporary period, a shortcoming of Kiser et al.'s research is that it assumes that under conditions of modernity, a bureaucratic system will be optimally efficient. However, we need to extend our standards of evaluation beyond the traditional understanding of standard bureaucratic design because of digital innovations that offer substantially superior alternatives to century old systems of unmediated, interpersonal, hierarchical management.

The Problem of Powerful yet Low-Dependence Agents

The most basic solution to the problem of agency is to align the interests of the agent with that of the principal. When lawyers earn a percentage, or salespersons work on a commission, the contractual relation is written to allow the principal to

assign a portion of the proceeds to the agent, which is paid in direct relation to the agent's capacity to succeed. In the simple principal/agent (where the principal is the owner who stands to gain materially from successful completion of agent duties), the systems of monitoring and sanctioning only need to be applied to the agent because the principal is automatically aligned with her or his existing interest in the success of enterprise. The principal, by virtue of ownership can claim exemption from monitoring as well as the right to impose the conditions of the contract. The agent can try to negotiate alternative conditions, but the agent's primary recourse is to simply refuse the work, thereby forfeiting claim to any compensation. This arrangement works as a solution to the agency problem in simple organizations where owner/principals can be clearly identified. However, most large organizations create additional challenges.

Large organizations often employ many levels of management, and those managers often behave both like principals (in terms of power) and like agents in terms of interests. All managers, but especially upper-level managers will often be granted the privileges and status of the owner/principals (relative freedom from monitoring and sanctioning, power to create contracts, high compensation; for a related discussion of overcompensation and corruption see Zyglidopoulos et al. 2009). However, these actors, who take a managerial role, frequently do not hold sufficient interest in the success of the organization. The executive privilege that high-level managers retain would seem to be a traditional carryover of rights from a simpler model of organization where the executive level manager is the owner, and thus a true principal. High-level executives typically will have access to corrupt opportunities that are both highly lucrative and damaging to the interests of the organization. When viewed from outside of an organization, or from the vantage of a true principal of an organization who is entirely dependent on the success of an organization, it seems quite strange that these glorified agents enjoy such power and latitude with far less monitoring than lower-level agents. For any individual agent, the degree of compliance with organizational missions and values depends on the degree to which agents are dependent on the success of the organization for their own current and future well-being. For the organization, cooperation and success depends on the degree to which dependence is universally shared across agents and roles. Corruption will be limited to the extent that hierarchical elites do not hold different organizational interests than rank and file agents and the organization as a whole.

Motivating Contribution to Group Goods Through Monitoring, Sanctioning, and Dependence

Hechter defines solidarity as the proportion of individual goods (time, energy, resources) that are contributed to a group (1988). Obligatory groups, such as communes or other voluntary associations face especially difficult challenges in motivating members to contribute rather than to free ride and enjoy the benefits of group membership without performing their group obligations. The key solutions in the sociological

rational choice approach involve the development of socially efficient systems of monitoring, sanctioning, and dependence. While Hechter's (1988, 1990) work focuses on obligatory groups, firms and other compensatory groups still face major challenges in ensuring contribution even with the additional leverage of contracts and pay incentives.

In face-to-face interactions, and especially in large organizations, systems of monitoring and sanctioning are often incomplete, and key organizational members may experience low levels of dependence, seeing plenty of alternative opportunities and low exit costs. The same monitoring challenges confront common pool resources and related communities and industries (Keohane et al. 1993; Coleman and Steed 2009). Improving systems of monitoring and sanctioning should result in higher levels of compliance with organizational values and lower levels of corruption. Theories of common pool resources, group solidarity and agency all suggest that actors who are strongly dependent on the organization will be less susceptible to corruption and, further, that developing effective and efficient systems of monitoring and sanctioning are necessary preconditions for achieving high levels of contribution and low levels of corruption. This chapter offers two key extensions, first, that firms and other compensatory organizations still require major improvements in the design of monitoring, sanctioning, and dependence, and second, that the asymmetries of control and privilege that are traditionally associated with rank in organizations must be replaced by a distributed system of control, or we will not escape from the iron law of oligarchy.

Distributed Social Sanctioning, Norms, and Organizational Controls

Organizational norms can be understood as the informal rules and expectations that control the actions of some organizational agents under certain conditions (Coleman 1990). In Coleman's understanding, proscriptive norms arise as solutions to imbalances of externalities. An externality is a third party cost that arises due to an agent's actions in a given situation. If an agent of an organization acts in ways that create negative externalities for others, those other members have an incentive to exert negative sanctions, and to the degree that they do so, we can say then that a proscriptive norm emerges as an informal means of controlling the proscribed behavior. Similarly, prescriptive norms arise when third parties award positive sanctions for behaviors that generate positive externalities for them. In Coleman's model, when and where norms arise becomes an empirical question, one that depends on the capacity of third parties to impose negative sanctions for violations and positive sanctions for compliance. However, the informal and personalistic nature of sanctioning behavior gives rise to additional challenges, such as the second order free rider problem (Heckathorn 1989; Coleman 1990; Panchanathan and Boyd 2004) where third parties are unwilling to exert the social sanction on norm violators because they fear retribution or are otherwise unwilling to pay the cost of delivering the sanction.

Further problems arise with organizational norms when those norms reward behaviors that undermine the organizational mission, contradict organizational values, encourage shirking, or otherwise impede compliance with official rules or with participation in formal monitoring and sanctioning systems (Jones 1983). Organizations may introduce special offices, like that of the ombuds, to internally address issues of institutional justice and equity (Huther and Shah 2000). Such offices offer a partial solution to the fact that traditional hierarchies can themselves become sources of actions and influence that undermine the mission of the organization or violate rights of organizational members. Review boards, abuse hotlines, whistleblower rules, or other mechanisms can offer a partial solution to enabling distributed members of organizations to help enforce organizational missions or values. However, these types of mechanisms themselves can be abused and can be implemented for personalistic reasons or vendettas (Gould 2000). This work, research on norms, and one organizational culture all suggest that important improvements can be made in the capacity of organizations to facilitate effective social monitoring and sanctioning.

Informal Groups, Identity, Status, and Biases

All organizations face challenges in which the informal social network and identities of agents of the organization can give rise to factions or other subgroups that act in ways that undermine the mission and values of the organization. A major challenge for every organization is to create effective social control systems that reflect the mission and values of the organization. Organizational control systems that allow agents to sanction in knowledge of personalistic ties and identities open the organization to corruption of the very system of social control (Prendergast and Topel 1996). Agents in organizations can also be influenced by conscious as well as unconscious biases in their evaluation of others, according to research in status characteristics (Berger et al. 1972) and cognitive psychology (Greenwald and Krieger 2006). People evaluate the work quality of low-status actors lower; they defer expertise to higher-status actors, and in numerous ways allow status expectations to shape their assessments even when status differentials should have no bearing on content of a judgment (Berger et al. 1972). Status differences are especially problematic when they are correlated with organizationally defined sanctioning role. To the extent that personal identities and group memberships are connected to the evaluation of work performance, these biases threaten the legitimacy of the organizational control system.

Reputation, Evaluation, and Distortions of Judgment

People will work for fame and notoriety, and many organizations try to leverage the desire for esteem and respect in order to motivate members. In online communities, reputation systems are seen as important, though fickle, tools for motivating

contribution and exerting social control (cites). In Wikipedia, authors award barnstars to recognize noteworthy contributors, Ebay sellers work hard to curry positive reviews, redditors grant karma to those whose contributions they value, and many other systems all participants make comments, reshare, or assign positive or negative sanctions. Through all of these processes, actors accumulate the results of their past behaviors, and in so doing develop reputations, and these reputations have the potential to influence their future behavior and to influence how others behave toward them.

While reputation systems have the potential to spur contributions, encourage prosocial interaction, and otherwise aid organizational missions, they can also distort and undermine evaluation systems in organizations. The Matthew effect (Merton 1968; others) describes the tendency for reputation systems to distort assessment of current merit: Those which are already well known, or perceived to be high status, attract more than their fair share of accolades and endorsements while those which are less known go wanting. Reputation systems can lead to a "winner takes all" society where the rewards for performance are disproportionate to objective differences in performance (Frank and Cook 1996). When people are given a judgment task, they tend to grant too much quality to the work of the famously good and not enough merit to the work of the obscure. When agents in organizations evaluate work of peers, their judgment is distorted by reputational information, and thus a system that blinds evaluators to the identity of the contributor will provide a more accurate assessment of that work.

Reviewers can clearly be influenced by the reputations of those they review, but they may also be influenced by the awareness that their review may contribute to their own reputation or assessment in the eyes of others. The story of the emperor's new clothes underlines a second problem that reputation systems create for evaluation processes in organizations: Public reviews of quality become subject to concerns about how exercises of judgment reflect upon the judge. Reviewers can be reluctant to express support for unpopular work or unpopular contributors, or under other circumstances, reviewers will use their assessments as statements to draw attention to themselves for a variety of reasons, distorting the assessment that they would make if they were purely trying to accurately measure the quality of the work in front of them.

Double-blinded peer review in the scientific academy demonstrates how an institution has adopted procedures to overcome reputational concerns in the assessment of quality. Even with those efforts, we can still point to examples of authors whose work makes them largely identifiable, and in others where reviewers may tip their hand, revealing their own identities. However, even if the implementation is imperfect, the effort to double blind reviews in the scientific process provides support to the claim that the reputational issues raised above present an important threat to the validity of assessment in organizations. Issues of reputation can distort evaluation processes in organizations, and without a system for double blinding the review process, such reputational concerns will always be present. This threat should be addressed at a larger scale and across the full range of organizational contexts where the accurate measurement of member contribution is important for the success of the organization.

We can use the term "organizational fidelity" to refer to the capacity of an organization to actually implement its mission, to encourage exemplification of its values, and to maximize the productive contributions of members. The concepts discussed above identified challenges to social control and evaluation in organizations. Taken together, these concepts suggest ways that organizations vary systematically in the degree to which they either facilitate or impede organizational fidelity. While it may seem utopian and unrealistic, digital institutions have the potential to combine features that previously were impractical, costly, or unrealistic. We can now build organizations that are not limited by the shortcomings that Michel saw as inescapable, and thus the next section provides an ideal typical model for high-fidelity organization that could actually be implemented.

Design Elements for Distributed Organizational Control

Computer-mediated work provides new opportunities for organizations to solve the long-standing problems of social control that lead to corruption in organizations. These problems stem from asymmetries in the flow of and access to information about organizational contributions, and in asymmetric constraints on capacities for exerting control through monitoring and sanctioning. This section outlines the necessary conditions that when combined would allow all organizational agents to constitute the systems of organizational control that will allow the membership of an organization to reward compliance with organizationally defined values and to prevent agents from exploiting asymmetries of information for their own advantage. The purpose of this section is to describe the full list of attributes that need to be designed into an organization that can overcome oligarchy through distributed organizational control. This section also helps to articulate an ideal type that can be used as a standard to compare to extant organizations that will reveal the sources of corruption in those organizational designs.

Mission A clear mission statement is needed to allow all agents to judge their contributions and the contributions of others according to how effectively those actions advance that mission. The mission helps to define how the values of the organization are expressed, and thus how the quality of contribution is created through agents' actions and how it is measured in the evaluation process.

Values Values are represented in dimensions of agents' actions on behalf of the organization. Organizations need value statements that can be clearly translated into actions, and the qualities of those actions need to be measurable and comparable in terms of those values. Organizational values need to be clear and concrete enough that when an agent commits an action on the behalf of the organization that this action can be at least interpreted as good or bad, and as better or worse than comparable actions.

Contributions All organizations require agents to take actions on the behalf of the organization. These contributions are of different types and will vary in terms of

quality and impact. An effective system of distributed social control will require a set of definitions of the types of contributions that will be collected, evaluated, and sanctioned in the system. The effectiveness of the organizational control system depends on the capacity for the most important contributions to be recorded digitally and for their dimensions of quality to be accurately recorded in the system and thus be made available for distributed evaluation.

Criteria of Evaluation Criteria of evaluation are the definitions that apply the organizational values to the measurement of quality for the defined types of contributions. These criteria need to be expressed with enough clarity that third parties could employ those criteria upon a sample of actions and achieve a high degree of intercoder reliability. Reliably measurable attributes of content is a standard expectation for content analysis, and to the extent that actions are rendered as textual records of agent actions, measurement of the quality of individual actions in an organization will need to, at least, rise to the level of basic social scientific methodology.

Digital Work Efficient distributed organizational control requires a digital environment. Work performed in a digital environment creates digital records that can be stored and selectively displayed while linking to stable identities, but while also controlling the flow of identity information in ways that are not feasible in face-to-face interaction. Not only are costs of monitoring and sanctioning reduced, but the system can be used to both maintain and obscure the key links between identity, evaluation, and sanctioning discussed in the Section "Theoretical Models for Controlling Corruption in Organizations."

Completeness of Information The greater the percentage of each agents contributions are accurately recorded in the work system the more effective the system will be at both motivating contribution and directing those actions toward the mission of the organization. The complete system would be both motivating (because all actions would "count") and would be mission enhancing because contributors would be aware that the quality of their contributions would be measured.

Double-Blinded Evaluation Digital environments make it possible for the content of a contribution to be presented in a context that obscures the identity of the contributor and the evaluator while maintaining a connection to their identities. This allows evaluation to be based on the quality of the contribution rather than the reputation of the agent or any other biased rational. Furthermore, the identity of the evaluator is blinded during the act of evaluation to remove consideration of positive or negative second-order sanctions. Inescapably identifiable actions, like decisions by agents in leadership, are subject to single-blinded reviews, so that the reviewers can honestly assess the value of the contribution without fear of retribution. Inescapably identifiable contributions are a predictable result of leadership roles or highly distinctive tasks, and thus, given the fact that these will be subject to review that is not blinded, they should motivate extra compliance with known criteria of evaluation since the reviews of the evaluations will themselves be blind peer reviewed.

Evaluation Is Itself Reviewed Evaluation acts are contributions that are themselves subjected to double-blinded evaluation. This gives evaluators incentive to maximize the accuracy of their evaluations.

Performance-Based Compensation To the extent that dimensions of agents' contributions are accurately recorded in the system, their compensation should depend on the quality of their contributions. Unless the values of the organization are enforced through the compensation system, they are like laws without the sword, mere words (an analogy to Hobbes on the necessity of force as the defining dimension of the state).

Dependence and Distribution of Dependence Compliance with organizational rules and degree of contribution toward organizational mission will be higher when agents are more dependent on organizational compensation for the current and future well-being. The distribution of dependence of agents within the organization should reflect the importance of the compliance of those agents with the values of the organization and capacity to contribute to the success of the mission.

Uniform, Universal Constraints on Agent Control over Visibility of Contributions All agents have equal and limited capacity to influence the visibility of their own contributions and the visibility of others.

Uniform Evaluative Rights and Obligation All agents are equal participants in the organizational control system. Each agent has equal access to and obligation to participate in the evaluative role.

Uniform, Universally Subject to Evaluation All agents of the organization have their contributions recorded by the digital work systems and made available for evaluation.

Open Code and Transparency of Rules The only way to ensure that digital infrastructure is not itself corrupted is to open the code to knowledgeable review and correction. The only way to ensure that the rules of the organization are not being manipulated to favor some at the expense of others is to open those rules to review and correction. Openness, review and correction in the machinery of the digital work system is necessary to prevent organizational agents from distorting the function of the distributed organizational control system.

Summary of Design Elements for Organizational Fidelity and Effective Organizational Control

The attributes listed in the Section "Design Elements for Distributed Organizational Control" can be used as a preliminary ideal type. By holding up these standards, we can compare the ideal to extant organizations and see dimensions where current organizations have features that deviate from distributed organizational control and therefore where those organizations contribute to corruption and oligarchy. It is

immediately apparent that traditional features of organizations exist in stark contrast to these design elements (Table 8.1).

In general, we see that despite the fact that high-level contributors in organizations act primarily as agents rather than as principals, privileges associated with rank make them less subject to organizational control and more likely to become corrupt. Organizational fidelity is actively undermined by the concentration of privilege related to capacities for social control. The more that privileges of social control are concentrated according to rank in hierarchy, the more oligarchic the organization will tend to be and the more likely that corruption will undermine organizational fidelity. The more universally distributed the items are, the more democratic the organization will tend to be and the higher fidelity we expect for implementing the organizational mission.

Implementations for Organizational Fidelity: Partial Examples from the Contemporary Social Media Ecosystem

Existing social media systems and some organizations currently implement procedures and rules that enact some aspects of organizational designs discussed above. These systems are far from perfect, and they retain many attributes typical of institutions that readily encourage corruption and oligarchy. In this discussion, I will try to focus on helpful lessons to draw from existing systems and identify paths to strengthen the potential for effective distributed social control.

Universally Distributed Capacity for Monitoring and Sanctioning, Semipublic Sanctioning, Reputation Systems

Both Reddit and Wikipedia represent large-scale experiments in universalizing the capacity for monitoring and sanctioning across a population of participants. In Reddit, every post and every comment is subject to evaluation and can be sanctioned. Every member of the community can exert an equal (though weak) sanction, delivered either to a comment or initial link post of any other participant. Quantitatively, sanctions are minimally expressive: Each login identity can grant a single upvote or downvote per item. Additionally, participants can reply to posts or comments, and in so doing, administer a qualitative sanction, which, to the degree that comment influences the reading and voting behavior of others, can result in larger-scale changes in the vote count or "karma" of the login identity to whom they have replied. However, upvoting and downvoting behaviors are not subject to review or evaluation, and no justifications or explanations of voting decisions are integrated into the social control procedure. Therefore this social control measure is not itself subject to social control, lending to potential arbitrary and antisocial implementations.

Table 8.1 Comparison between distributed social control and traditional organizations

Dimension	Distributed control	Traditional organizations
Mission	Clear, formal, public; directly linked to values	Varies
Values	Explicit, clear, concretely tied to desired contributions of organizational actors	Varies, seldom clear and complete enough to allow systematic, valid review
Contributions	Codified into measurable, important types that are digitally recorded	Widely varied by level in hierarchy, clarity of contributions decreases with status in hierarchy
Criteria of evaluation	Clear and complete enough to allow high intercoder reliability	Hazy and incomplete, especially at higher levels in hierarchy
Digital work	Extensive use of digital participation systems for all crucial types of contribution	Few if any of the key decisions or contributions are recorded digitally in any monitorable form
Completeness of information	Full records of all digital work is made available to evaluation system	Little if any of digitally recorded work is made available for systematic review
Evaluation	Double-blinded evaluation for all feasible actions, single-blinded review for inescapably identifiable actions	Organizationally determined by role and position in hierarchy, top down review of lower-status agents
Review of evaluation	Automatically and universally included as feature of evaluation process	Reviews are not systematically monitored, and if review is made, it is made by hierarchically privileged actors
Compensation	Compensation from organization depends upon quality measured from evaluation process	Compensation dependent on privilege in hierarchy as well as control over compensation of others
Dependence	Maximize dependence of agents on quality of contribution toward both long- and short-term organizational mission, distribute dependence uniformly through organization	Hierarchically defined privilege in freedom from dependence and capacity to control dependence of subordinates
Visibility of contributions	Uniform and universal obligation for contributions to be visible to digital recording system	Hierarchical control over access to own contributions as well as access to others
Evaluative rights/obligation	Uniform and universal right to and obligation to participate in evaluation system	Hierarchically defined privilege to engage in evaluation and to hide contributions from evaluation
Subject to evaluation	Uniform and universal subject to evaluation of contributions to organization	Organizationally determined by role and position in hierarchy, top down review of lower-status agents
Transparency of rules	Transparent and public rules, open source code for all digital institution systems	Access to rules a privilege of rank, capacity to change rules also a privilege of rank. Limited transparency

Another general source of bias in implementation comes from the fact that sanctioning of particular posts or comments results from the organic process of reading and commenting on whatever is interesting to each participant, and thus the vote count for any contribution can be greatly influenced by arbitrary circumstances. Another shortcoming relates to the potential for valuable contributions to receive too little attention, and trivial contributions to receive too much. These will distort the vote total measures in ways that diminish their potential to reflect community goals or standards. There are no automated processes for delivering contributions in need of sanctions to participants, and there is no obligation to sanction particular contributions, and there is no systematic process for making sure that the review process is providing the feedback that would enhance the organizational mission.

Wikipedia faces similar challenges for evaluating contributions of members. Because all edits are recorded, and the login identity accompanies the timestamp on the edit, the wiki software allows actors to sanction particular edits. However, this edit is typically made when reviewers also have access to knowledge about the identity of the contributor (Edits by IP addresses are normally treated with great skepticism as are edits by recently created login identities). The fact of automatic recording of editor identity is what allows Wikipedia to eventually identify contributors, like sock puppets who use multiple proxy accounts to circumvent organizational rules on appropriate editing practices (Owens 2013). However, the presence of identifiers with each edit makes all wiki systems susceptible to corruption in the forms of the Matthew effect, vendettas, patronage, and other types of bias based on identity of the contributor. However, the fact that the default condition in Wikipedia is for all editors to have equal access to contribution information and to all have potential to deliver some sanction takes a major and important step toward a distributed digital organization. Implementing a supplemental review system based on double-blinded peer review could allow additional progress in this direction.

Double-Blinded Peer Review Systems

Digital systems can automate procedures for double-blinded peer review. To implement review in online work settings requires identifying sets of equivalent tasks (in this case, homeworks) which can be collected during a period of time and then later redistributed to a pool of potential reviewers through the collection interface. CrowdGrader (de Alfaro and Shavlovsky 2013) is just such a tool designed for instructors to use in courses where the students can act as graders of the assignments of their peers. After submitting an assignment, students have a rubric, grading instructions, and are presented with a series of anonymized assignments to review. They score and range the assignments and leave qualitative feedback. After the period of review ends, students can view the scores and comments from the variable number of (typically 5 or 6) reviewers who judged their contribution. Students have the capacity to respond qualitatively to reviewer comments and grades as well as assign a negative or positive score to that review. I have used this tool in my courses, and it seems

to have some beneficial effects on student's perceptions of the legitimacy of their marks as well as expanding students' awareness of the range of variation in quality of work. In addition to organizing the presentation of assignments for review, the system uses recommender system algorithms to judge the accuracy of reviews and penalizes students scores if their assessments are inconsistent with consensus, and it also assigns greater weights to the reviews of students whose own work is highly scored. Students, as a part of their assignment grade, are obligated to perform reviews as part of their assignment grade.

A system like CrowdGrader is not perfectly applicable to work environments, but it is an extremely valuable illustration of how computer-mediated systems can lower the transaction costs involved in a distributed, double-blinded review system. The general approach could be extended and developed and could be applied to other types of digital contributions ranging from writing prose, writing computer code, contributing to online discussion, editing resources like Wikipedia, and any other work-related task that can be divided up into relatively discrete and comparable chunks of work. The conflict of interest raised by within group comparisons, as well as difficulties in fully anonymizing work, can be solved by extending the population of reviewers beyond a particular organization. Reviewers, for some tasks at least, could be recruited through Amazon's mechanical turk, or other crowdsourcing resources, could be partly automated or could be identified from comparable external organizations. For instance, decision-making contributions in an online meeting from one part of an organization could be reviewed by members of a different part of that organization who lack the contextual knowledge to infer identity of participants.

Partial Illustrations in High Tech Firms

Some high tech firms make efforts to enforce a relatively flat organizational structure and work to minimize layers of management between engineers and top executives. Regardless of where this inclination comes from, this organizational structure can help reduce the tendency toward oligarchy to the extent that it enumerates items from a list based on theory and ideal type. Reportedly, companies like Google, 37signals, GitHub, Facebook, and Valve make efforts to keep their organizations relatively flat (Fried 2011). In particular, organizational structure described by the New Employee Handbook at Valve (2012) emphasizes the importance of a flat organizational system as well as other principles of worker autonomy and equality (see also Woffard 2012).

The New Employee Handbook describes several principles that are consistent with generating higher organizational fidelity but the list is partial, and some key issues such as the influence of reputation on assessment and the lack of double-blinding peer review are not addressed. The first principle is a fundamental commitment to role equality and the seemingly radical commitment to a flattened work environment "Welcome to Flatland" (Valve 2012, p. 4). In practice, this commitment implements some important features of a distributed organizational control because by flattening the work groups Valve eliminates many of the hierarchical asymmetries between

manager and "managed" in terms of monitoring, sanctioning, and availability as the subject of monitoring and sanctioning. By working as peers in more freely flowing workgroups, particular employees do not have the same organizationally enabled capacity to exert favors or introduce biases and thus take important steps. Freedom of choice for selection of work is another foundational principle that makes the job much more attractive to creative workers, but also reduces leverage of holders of hierarchical positions, at least to the extent that multiple promising projects exist for a particular employee that flexibility reduces the coercive power of those in leadership positions.

Valve implements an extensive system of peer review, participation in which seems to be universally mandated. All employees are obligated to review some number of their peers, and some of their peers must evaluate them (Valve 2012, p. 25). This universal participation in evaluation takes an important step toward distributed organizational control. However, this process is not blinded, so it will likely be subject to the same reputational distortions and constraints that conventional review processes are. Also, to the extent that targets of review are self selected by reviewers, such a process may lead to greater "winner take all" effects than would a more regimented system of review. There seems to be a risk that those with more easily visible work or with bigger reputations would end up with inflated reviews while more obscure contributors are likely to have their work undervalued. The Valve Employee Handbook is noticeably missing provisions for assessing quality of contributions without knowledge of reputation, and thus issues of coalitions, the "Matthew effect," and other reputation driven flaws in organizational fidelity are likely to arise.

The Employee Handbook mentions many perks for Valve employees: free laundry service, espresso drinks, food, massage, and company trips (Valve 2012, p. 19). All of these benefits are collective goods that members enjoy as employees, but they are primarily valuable in terms of reducing transaction costs, saving time, and allowing employees to focus more of their time and energy on their work. Time is more valuable than money to the intrinsically motivated, and an employer who provides these perks makes the employees more strongly dependent on their employer not simply for the job but for the well-being that they enjoy from not having to spend focus on everyday hassles of life.

Taking Valve as an example, a truly double-blind system of review may be difficult to implement. Some aspects of creative work will be uniquely identifiable, and some aspects of publicly identifiable accomplishments are important to reward in the organizational compensation system. However, all workers will also make contributions to smaller dimensions of work, to decision making, to meetings, and to other less distinctive contributions. To the extent that these important but less distinctive contributions can be performed through digital means, they could represent a distinct data stream for generating an independent source of performance evaluation. One can imagine a firm like Valve implementing a split system of evaluation that maintains their current peer stack assessment system (with its known flaws related to reputational effects) while introducing a second stream based on a double-blinded measurement system of digital contributions. Combining these data streams to predict appropriate compensation would help identify where deviations

between the measures occur. Deviations would arise both because of differences in the types of work contributions that are measurable by both and also to instances where reputational effects are distorting organizational fidelity.

Future Implementations for Improving the Fidelity of Organizations

The potential fidelity of an organization can be improved through distributed social control. Many design features of contemporary organizations undermine fidelity by exaggerating problems of agency, magnifying reputational and personalistic biases, and excluding most organizational members from exerting formal monitoring and evaluation processes. We can see that some recently developed organizations in the technology field have adopted flatter organizations, some aspects of peer review, and embraced principles of more open collaboration. These have shown some success in quality of work, creative productivity, and, to some extent, in the perceptions of legitimacy of the organizational systems. However, all of the example organizations omit key principles outlined in the ideal typical model of distributed organizational control.

Limited and partial implementations that we can observe in extant organizations can only provide limited insights into the operation of distributed organizational control. In the future, the best insights will require experimental tests of alternative designs of full systems within units of larger firms, in the context of social control systems in online games, in distributed collaborative projects, or in classroom environments.

Another productive direction for development would be to design a digitally mediated interface for meetings that would be "better than being there" and would include design features derived from the model of distributed social control, such as double-blinded review, equally distributed responsibility for evaluation and sanctioning, etc. Meetings are widely understood to be necessary, but also incredibly inefficient at advancing the organizational mission. We also know that meetings are very constrained by limitations of status, hierarchy, and reputation effects. A better interface for organizational decision making that made meetings better would be a tool that could be developed and implemented, and in so doing, it would spread examples of types of organizational principles that decrease the tendency toward oligarchy and increase organizational fidelity.

Another productive direction for implementation would be to introduce distributed organizational control as a secondary data stream for an existing review and evaluation system and to attach to it a separate stream of compensation in an organization. For instance, in an academic course, tools like CrowdGrader could be used to assign a portion of the points from assignments created, managed, and evaluated by the students themselves. Half of their grade could depend on a traditional set of assignments and the other on the set created by the students. Similar innovations could be explored in voluntary associations where members of organizations could experience both traditional and distributed systems of organizational control.

Implementation of the principles of distributed organizational control will require testing in small settings and in settings where the institutional hierarchy is not threatened by the loss of privilege that elites in the system enjoy. Certainly, the many deans of your typical university would not agree to be eliminated by a policy of distributed organizational control even if their roles of oversight and management could be organized with higher fidelity by a distributed network of faculty and administrators. Such a change would only happen once greater organizational efficiency became a necessity and if that faculty already had experiential insight into distributed organizational forms. This experience could come in their courses, in research groups, or within their departments but only if researchers develop accessible tools for those principles in circumstances that help them solve their existing problems.

Implications of Implementing Distributed Organization Control

What are the expected implications of implementing a system of distributed social control where all agents are subject to universal system of monitoring and sanctioning that captures accurate records of all of their organizational contributions, including their contributions to organizational decision making? A system where their organizational rewards are dependent on their evaluation in that system? A system where the evaluations they receive, as well as those that they make, are not biased by knowledge of identities or attributes of others. They evaluate as fairly and accurately as they can because their own evaluations are subject to blinded peer review according to the values of the organization and established, shared criteria of evaluation?

First, we expect a higher level of social order. There would be less corruption, less malfeasance, simply because of the presence of effective monitoring and sanctioning, combined with the knowledge that any such acts would generate sanctions delivered by the distributed evaluations of their peers. Second, we should expect that a higher percentage of agents' organizational actions would be productive work consistent with the mission of the organization. Third, we expect that opportunities to exert corrupt influence based on personalistic ties, favoritism, or other biases would be reduced. Fourth, agents who know that their work is being evaluated according to organizational criteria, that they themselves apply to the work of others, and whose work they are obligated to review will be likely to see resulting evaluations of their own work as legitimate. Finally, agents working in such an environment and implementing their part of the distributed system of monitoring and sanctioning would likely come to see such a system as legitimate, more so than conventional systems to which they are a part of. This experiential dimension could increase the demand for the practices and principles of distributed social control in other organizational systems. This effect is much like the existing demand among high tech workers who, having experienced effective peer collaboration systems, have developed a strong preference for that structure and who may be deeply skeptical of executives who impose hierarchy and demand compliance without the behavioral foundation of equality that those workers experienced in their work groups.

Digital institutions do not automatically create equality, justice, or efficiency, but depending on how they are structured, digital systems of interaction and social control offer new opportunities to address long-standing organizational problems (Kollock and Smith 1996; Glaser and Ebersbach 2004; Suh 2008). We have new opportunities to design our institutions in ways that have never been possible before and to implement them at unprecedented scales. While small-scale, localized solutions to social dilemmas have been documented (Keohane et al. 1993), digital institutions that implement distributed organizational control can address the corruption problem of organizational oligarchy that has long been recognized, but not fully addressed (Michels 1915; MacLennan 2005; Mason and Misener 2006).

Conclusion: We Need High-Fidelity Digital Organizations as Alternatives to Our Institutional Antiques

This chapter began by listing technological advances in science and engineering. If you watch enough TED talks, it would seem as if our social problems will be solved through technical means (we need yet another more efficient solar panel or a laser that zaps mosquitoes). However, I would contend that our most-limiting shortcomings are imposed by our social systems and that what we really need to work on is the development of digital institutions that create systems of distributed organizational control.

The greatest challenges faced by human societies will require unprecedented levels of cooperation and contribution. We need effective, high-fidelity organizations to overcome major new challenges. Succeeding on those challenges will not be possible while relying on institutional antiques and organizations with low-organizational fidelity. The problems inherent to current organizations are cast in stark relief when we seriously consider theoretical models of agency, social control, reputations, and biased expectations. Similarly, digital systems for interaction are already being developed that allow for structures of interaction that are not possible in face-to-face systems, and these digital institutions can enact double-blinded peer review, efficient systems of monitoring and sanctioning, as well as distributed systems that allow all members to participate in the exercise of social control. We need social scientists and computer scientists to team up to design and promote new digital institutions that overcome the many pitfalls of earlier hierarchical designs.

We need to keep our lofty ambitions, but we need to start small and think about building systems that can be used as tools within existing organizations. We can see glimpses of organizational innovations (Wikipedia, Reddit, Google, Valve, CrowdGrader), but we need to be thoughtful and integrative to build systems that more completely address the problems that reduce the fidelity of organizations. There are promising opportunities to experiment with distributed social control in online communities, online gaming systems, academic courses, and with specialized tools like computer-mediated systems that make key aspects of organizations (like meetings) work more effectively than they do in person. Cultivating experience and success in

these limited areas will provide a baseline for integrating the same types of practices into larger and more socially influential organizations.

We need a global distributed effort, a space race for high-fidelity organizational design. The organizations that can effectively solve the problem of oligarchy will provide much more fair and equal work environments for their members, they will more accurately reward the productivity of all members, and they will minimize opportunities for those in leadership roles to turn organization into oligarchy. High-fidelity organizations should also enjoy substantial comparative advantages, such that eventually they simply outcompete the institutional antiques. But we will not actually see that better world unless we develop new institutions that let us work together better.

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